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SUMMARY OF NATIVE PLANT PROPAGATION AND RE-INTRODUCTION IN HAWAII VOLCANOES NATIONAL PARK [1/]

David K. Morris [2/]

In addition to its principal attraction of periodically active volcanoes, Hawaii Volcanoes National Park presents some very interesting natural exhibits in its forests. A number of tree species are difficult to observe in their natural state outside of the park; many of the readily seen examples owe their existence to past propagation efforts by the park staff.

Two primary factors gave rise to the need to propagate artificially and plant certain tree species. The introduction of goats and cattle was, and continues to be in some areas, the most serious decimating agent. The speed with which a native forest dies out as a result of browsing and grazing animals was noted as early as 1856 by an anonymous writer. In Hawaii Volcanoes National Park, one instantly thinks of the introduction of feral goats in 1794; however, cattle were brought to the island as early as 1793. It is only on the lower slopes of Mauna Loa that cattle have had a pronounced effect upon the park flora, though cattle have occasionally strayed into

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1/ This is an abstract of a 48-page report which includes all known planting dates and locations of all plantings of native species which have been undertaken in the Park.

2/ Staff Park Ranger (Wildlife Management), Hawaii Volcanoes National Park

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other portions from adjoining ranches. A September 1968 estimate shows that about 4,500 goats are still present despite continuous control efforts by the park staff. Studies are currently under way to clarify the goats' total effect upon the various vegetation communities.

A more insidious factor is the dense cover of exotic grasses and shrubs covering large sections of the park. Seeds from the few remaining examples of some trees are unable to germinate and grow in this thick matting. Often the seeds are unable even to reach the substrate in which they might establish themselves.

Though several sporadic plantings were made earlier, the first major propagation and transplanting efforts began in 1935. The CCC program in the park directed literally thousands of man-days toward eradicating introduced plants and transplanting common shrubs and trees to cover road scars and other disturbed areas. CCC personnel also provided the man-power in constructing the park nursery in December 1937. There was some conflict over the objectives which the park staff would endeavor to carry out in the nursery. There were those who wished to raise large numbers of the more common shrubs and trees, generally with landscaping in mind, and others who preferred to concentrate on limited propagation of rare trees in order to restore some examples to their former habitat. A specific policy was never developed, and the function of the nursery continued to vacillate between these objectives for the next 25 years.

The nursery program can be divided into three periods. Each one of these was made conspicuous by the interest and energy of key personnel, who, given the necessary latitude by interested supervisors, were able to devote considerable time to the project. Though room does not allow adequate recognition of all key individuals, several names are inextricably associated with each major period of activity.

Park Ranger Gunder Olson must be given credit for getting the program off the ground between 1939 and 1941. Though the neglect resulting from the events of December 7, 1941 undid much of Olson's work, the importance of his achievements must not be overlooked. By bringing 11 different native species to the transplant stage, Gunder Olson provided irrefutable evidence that native types could be successfully propagated by nursery methods. This was in contradiction to the widespread belief in the Territory that native trees were too hard to handle to warrant their propagation.

Park Ranger Clifton Davis and Assignee Arthur Mitchell, working under the direction of Chief Ranger Gunnar Fagerlund, headed the next period of activity between 1945-1947. Their efforts were primarily directed at propagating and re-establishing endangered native forms. There are still trees growing in the park which reflect the success of this period.

Nursery activity was almost continuous between 1949 and 1962, though some years were naturally more productive than others. The period began with the emphasis on mass production of koa and mamani trees, shifted to strong emphasis on rarer species, then returned to earlier landscaping ventures. A prime source of planting stock during this period was the Territorial Nursery in Hilo, with much useful assistance from Associate Forester L. W. Bryan. The majority of the visible evidence remaining from the nursery programs can be traced to this period. The number of individuals playing key roles is such that deserved credit cannot be cited; however, two members of the park itself must be given credit for much of the field work during this active phase. Forestry Technician Antone Medeiros had assisted Gunder Olson as early as 1940 and

took an active part in all succeeding programs until his retirement in 1962. His successor, John P. Hauanio, Jr., who had assisted Medeiros during the 1950's, took over the field work in 1962.

Several volcanic eruptions and a shift to emphasizing feral goat control caused the decline of the program in the early 1960's; the last nursery propagated planting was made in March, 1964. Sporadic plantings of breadfruit and coconut trees have been made during the last 4 years, but these were all transplants and did not originate in the nursery.

Though the nursery program was instrumental in helping re-establish several species, the job is not finished. Certain species, particularly lower elevation trees competing with goats, still need help. The perpetuation of each native tree species is one of the major goals of the rejuvenated research program in Hawaii Volcanoes National Park.

A detailed history, including names, dates and locations of all trees planted, is on file in mimeograph form at National Park Headquarters.

EXPLORING FOR THE CACTI OF THE CARIBBEAN [1/]

FRANKLIN W. MARTIN [2/]

The island chain of the Caribbean probably represents a relic of a land bridge between South and North America. Thus, at one time plants had the opportunity of travelling by natural methods from one continent to the other. Subsequently, with the rise of the water or subsidence of the land, segments of land were isolated, one from another, and through chance species were distributed irregularly among the islands. Subsequently, the species were frequently modified as adjustments were made to environmental trends. The result of this isolation, speciation, and infrequent interchange is that the islands of the Caribbean frequently are characterized by endemic species or varieties.

The Caribbean is not an area rich in cacti and succulents. But the species of this interesting region are frequently sufficiently different from mainland species to make them of special appeal to collectors and students of these plants. My own interest and enthusiasm grew from the realization that I was living among some unique plants, and I have combined this interest in plants in general with general interests in desert regions, camping, and exploring, to justify a series of trips into the desert islands of the Caribbean, and I expect these trips to continue.

1/ Based on a lecture presented at the Hawaiian Botanical Society meeting of October 7, 1968.

2/ Federal Experiment Station, Mayaguez, Puerto Rico. (Temporarily: Department of Horticulture, University of Hawaii).

The central mountain chains of the bigger islands of the Caribbean catch the rain-laden clouds of the trade winds, so that their slopes are frequently covered with rain forests. The leeward coasts and the small islands are usually much dryer, and frequently desert-like. The few rains come in torrential showers and do not interfere with the normal sunny, hot climate. Cacti are to be found chiefly in these areas, although Rhipsalis is confined to the rain forests.

Three areas where the cacti flourish are the south coast of Puerto Rico, and the islands of Desecheo and Mona. The latter, some 6 by 8 miles in size, consists of a limestone plateau up to 200 feet in elevation. The flora of this island is a rich assortment of hardwood shrubs and trees, often filled with bromebirds. Introduced species are few, and very little of the effects of mankind remain on this often-visited but seldom-inhabited place. The cactus species of interest here is Mammillaria nivosa, the snowy mammillaria. This species is rare and difficult to acquire, but is much prized for its white, wooly hair that fills the spaces between the nipples. M. nivosa is adapted to life under very difficult conditions. The plants thrive in direct sunlight, among limestone rocks where there is little soil. These plants cover the ground like a carpet in some locations. Near the lighthouse there is a forest of columnar cacti, Lemaireocereus and Cephalocereus.

The island of Desecheo is only a small, rocky projection one mile in diameter, 15 miles off the coast of Puerto Rico. Yet this island contains at least three species or forms of cacti not known on the mainland. Melocactus is represented by the species antonii, a large bodied type with long, flexible spines. Lemaireocereus hystrix has a body color not found on the other islands. Finally, the tree-like Opuntia moniformis, known also on the island of Hispaniola, is distinctive. Nesting sea birds, coral reefs, and the turpentine tree are among the interesting features of this uninhabited island.

The south coast of Puerto Rico differs from the islands in that it is frequently visited and often affected by man's activities. Nevertheless, certain features remain. On the extreme tip of Cabo Rojo is perhaps the largest stand known of Melocactus intortus. There plants grow in a grassy flat. Their height, including the specialized flowering head or cephalium, may reach four feet, and they may weigh between 50 and 100 lbs. Another species of great interest is Leptocereus quadricostatus, a primitive member of the cereus type that climbs by arching, and roots wherever the arches touch soil. The evolutionary position of this plant is not well understood. Another endemic species, almost eliminated from the island, is Harrisia portoriquensis, a very tall columnar species, that usually has no branches.

The islands of the Caribbean have few succulent plants other than cacti, but of those few, perhaps least known is a Vanilla species on Puerto Rico. The stems of this plant appear to be cords of rope, strung loosely through the bushes or hanging from the trees.

Travel through the desert islands of the Caribbean presents sufficient difficulties to characterize it as adventure. The plants are varied, little known, and still to be exploited for possible commercial and ornamental usage. I have emphasized the cacti, but my experiences here in Hawaii would suggest that the trees and shrubs would be equally fascinating to the people here for they are well-adapted to the drier areas so common on this island. Thus, my explorations of the future are cut out in advance and waiting for me.

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EDITOR. . . . . .Charles H. Lamoureux
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